

(19) World Intellectual Property  
Organization  
International Bureau



(43) International Publication Date  
4 August 2005 (04.08.2005)

PCT

(10) International Publication Number  
**WO 2005/071785 A1**

(51) International Patent Classification<sup>7</sup>: **H01M 8/06**,  
B01D 71/40, 71/42, 69/10, 69/12

(21) International Application Number:  
PCT/JP2005/000735

(22) International Filing Date: 14 January 2005 (14.01.2005)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:  
2004-009315 16 January 2004 (16.01.2004) JP

(71) Applicants (for all designated States except US): **TOYOTA BOSHOKU KABUSHIKI KAISHA** [JP/JP]; 1-1, Toyoda-cho, Kariya-shi, Aichi, 4488651 (JP). **TOYOTA JIDOSHA KABUSHIKI KAISHA** [JP/JP]; 1, Toyota-cho, Toyota-shi, Aichi, 4718571 (JP).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **ARAI**, Yasunari [JP/JP]; c/o **TOYOTA BOSHOKU KABUSHIKI KAISHA**, 1-1, Toyoda-cho, Kariya-shi, Aichi, 4488651 (JP). **MORITA**, Akishi [JP/JP]; c/o **TOYOTA BOSHOKU KABUSHIKI KAISHA**, 1-1, Toyoda-cho, Kariya-shi, Aichi, 4488651 (JP). **NAKAGAKI**, Nobuhiko [JP/JP];

c/o **TOYOTA BOSHOKU KABUSHIKI KAISHA**, 1-1, Toyoda-cho, Kariya-shi, Aichi, 4488651 (JP). **OCHI**, Tsutomu [JP/JP]; c/o **TOYOTA JIDOSHA KABUSHIKI KAISHA**, 1, Toyota-cho, Toyota-shi, Aichi, 4718571 (JP).

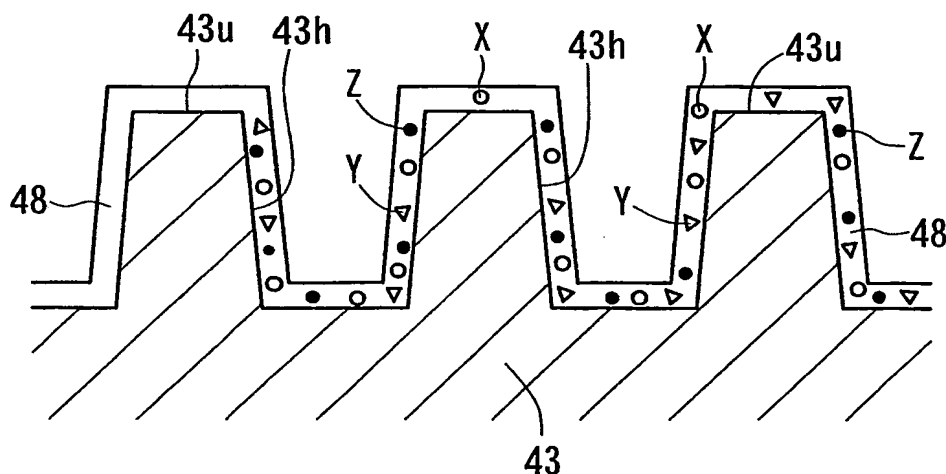
(74) Agent: **OKADA**, Hidehiko; Nagoya Chamber of Commerce & Industry Building, 10-19, Sakae 2-chome, Naka-ku, Nagoya-shi, Aichi 460-0008 (JP).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

[Continued on next page]

(54) Title: GAS-REMOVING DEVICES AND AIR SUPPLY SYSTEMS HAVING THE GAS-REMOVING DEVICES



(57) Abstract: A gas-removing device serves to remove impurity gases from the air supplied to a fuel cell via an air supply system. The gas-removing device includes a porous material and an alternate adsorption membrane. The porous material has micropores formed therein in order to absorb impurity gas particles contained in the air. The alternate adsorption membrane is formed on the inner walls of the micropores of the porous material in order to further adsorb and retain at least one type of impurity gas particles from among the impurity gas particles absorbed by the porous material. The alternate adsorption membrane includes at least one positively charged layer and at least one negatively charged layer laid alternately to one another.

WO 2005/071785 A1



**Published:**

- with international search report
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*